Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
Department of Environmental Protection

In the Matter of ALGONQUIN GAS TRANSMISSION, LLC	OADR Docket Nos. 2019-008, 2019-009, 2019-010, 2019-011, 2019-012 and 2019- 013 MASSDEP File No.: Application No. SE-15-027 No. X266786 Air Quality Plan Approval Weymouth, MA

PREFILED TESTIMONY OF PHILIP J. LANDRIGAN,

M.D., M.Sc., D.I.H., F.A.A.P., F.A.C.P.M.

Submitted in Support of the Town of Weymouth

Table of Contexts

I. Introduction

1. My name is Philip J. Landrigan. I am a pediatrician, epidemiologist, and public health physician by training and education. I am presently a Professor of Biology, Director of the program in Global Public Health and the Common Good, and Director of the Global Observatory on Pollution and Health at Boston College.

2. I submit this prefiled testimony in support of the Town of Weymouth and its Ten Citizens group in this proceeding.

II. Qualifications

3. My *curriculum vitae* is attached to this testimony as Exhibit A.

4. I am a 1959 graduate of Boston Latin School and 1963 graduate of Boston College. Following my undergraduate education, I completed my medical training (M.D.) at Harvard Medical School in 1967.

5. I thereafter obtained my professional licensure in Massachusetts in 1967 and in New York in 1985. Both licenses remain active and in good standing with no history of professional discipline.

6. In addition to my internship and residency positions, and following my graduation from medical school, I also completed post-graduate study in England obtaining a Diploma of Industrial Health and Master of Science in Occupational Medicine in 1977 at the London School of Hygiene & Tropical Medicine. I hold honorary

degrees from Amherst College ("Doctor of Science, *honoris causa*") and from Mount Sinai School of Medicine (same).

7. I am Board-certified in pediatrics (1973), general preventive medicine (1979) and occupational medicine (1983).

8. Immediately prior to assuming my roles at Boston College, I was a Professor of Preventive Medicine and Pediatrics at the Icahn School of Medicine at Mount Sinai, both positions I held from 1985 to 2018. From 2010 to 2018, I was also the Icahn School of Medicine's Dean for Global Health and from 1990 to 2015, I was the Ethel H. Wise Professor and Chairman for the school's Department of Preventive Medicine. I was also the Icahn School of Medicine's Director for its Division of Environmental and Occupational Medicine from 1985 to 1990. I am the Chair *Emeritus* for that school's Department of Preventive Medicine and a Professor *Emeritus* of Preventive Medicine and Pediatrics.

9. Over the course of my career, I have held adjunct faculty positions at the London School of Hygiene & Tropical Medicine, and the University of Washington School of Public Health and Community Medicine. I am presently an Adjunct Professor of Environmental Health at the Harvard School of Public Health and an Affiliate in the Department of Global Health and Social Medicine Epidemiology at Harvard Medical School.

10. I have also served in professional roles at government agencies. From 1997 to 1998, I served as Senior Advisor to the United States Environmental Protection Agency's Administrator, advising on Children's Health and the Environment. Before that,

from 1979 to 1985, I served as the Director for the Division of Surveillance, Hazard Evaluation and Field Studies, in the National Institute for Occupational Safety and Health.[1] Prior to that, I served in three different positions for the Centers for Disease Control and Prevention: from 1974 to 1979, I was Chief for Environmental Hazards Activity in the Bureau of Epidemiology; from 1973 to 1974, I served as Director for Research and Development in the Bureau of Smallpox Eradication; and, lastly, from 1970 to 1973, I was an Epidemic Intelligence Service Officer.

11. From 2015-2017, I served as co-chair of the *Lancet* Commission on Pollution and Health, a major international effort supported by *The Lancet,* the world's most widely read general medical journal, to determine the full impact of all forms of environmental pollution on human health. Our Commission's main finding was that pollution in all its forms was responsible in 2015, the most recent year for which we had data, for an estimated 9 million deaths, of which 6.5 million were due to air pollution.

12. I served from 1996 to 2005 in the Medical Corps of the United States Navy and retired at the rank of Captain (O-6). I served in Korea, Ghana and Senegal.

13. Over the course of my career, I have been fortunate to earn professional recognition through honors, awards, and professional appointments. Those are detailed in my C.V. I do not repeat them here.

1 The National Institute for Occupational Safety and Health is part of the U.S. Centers for Disease Control and Prevention, in the U.S. Department of Health and Human Services.

14. I hold expertise in the negative impacts to human health caused by exposure to benzene and formaldehyde.

15. In my professional career, I have published several articles in the peer-reviewed literature characterizing the hazards of exposures to both chemicals. These articles are listed in my curriculum vitae.

16. I have also been an invited member of an expert panel convened by the International Agency for Research on Cancer (IARC), the cancer arm of the World Health Organization, to review the carcinogenicity of benzene (IARC Cancer Monograph #29). I have testified before the US Occupational Safety and Health Administration (OSHA) on the carcinogenicity of both benzene and formaldehyde.

17. Over the past 25 years I have written numerous scientific papers and reports detailing children's elevated risks of exposures to a wide range of environmental threats to health. I have co-edited the major American textbook in the field of Children's Environmental Health.

III. Testimonial Purpose

18. I have been asked by the Town of Weymouth to review the Air Quality Plan Approval issued by the Massachusetts Department of Environmental Protection ("MassDEP") with respect to Application No. SE-15-027 ("Plan Approval").

19. Weymouth asked me to provide my professional opinions regarding that Plan Approval with respect to the potential public

health impacts from the projected or actual emissions of the natural gas compressor station that Algonquin Gas wants to construct in North Weymouth (the “Compressor Station”).

20. In connection with this testimony, I reviewed the following documents:

a. Air Quality Plan Approval, Application No. SE-15-027 (Jan. 11, 2019).

b. Massachusetts Department of Public Health and Massachusetts Department of Environmental Protection. Health Impact Assessment of a Proposed Natural Gas Compressor Station in Weymouth, MA (“Health Impact Assessment”).

c. Greater Boston Physicians for Social Responsibility. Health Risks of a Proposed Compressor Station in Weymouth, Massachusetts.

d. Massachusetts Department of Environmental Protection. Office of Research and Standards. Methodology for Updating Air Guidelines: Allowable Ambient Limits (AALs) And Threshold Effects Exposure Limits (TELs). Final. Boston: December 21, 2011.

e. Prefiled Testimony of Sandra Baird Ph.D.

f. US Department of Health and Human Services, Agency for Toxic Substances and Disease Registry. Public Health Evaluation of Long-Term Air Sampling Data Collected in the Vicinity of Natural Gas Operations, Washington County, Pennsylvania. Atlanta, GA: July 18, 2018.

g. Russo PN, Carpenter DO. Health Effects Associated with Stack Chemical Emissions from NYS Natural Gas Compressor Stations: 2008-2014. A Technical report Prepared for the Southwest Pennsylvania

Environmental Health Project Underwritten by the Park Foundation. Albany, NY: October 12, 2017.

h. GBD 2015 Mortality and Causes of Death Collaborators. Global, regional and national life expectancy, all-cause mortality, and cause-specific mortality for 249 causes of death, 1980–2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 2016; 388: 1459–544.

i. Landrigan PJ, Fuller R, Acosta NJR, et al. The *Lancet* Commission on pollution and health. *Lancet* 2018; 391: 462–512.

j. Landrigan PJ (Chair): Pesticides in the Diets of Infants and Children. Committee on Pesticides in the Diets of Infants and Children. Board on Agriculture, and Commission on Life Sciences. National Research Council. Washington: National Academy Press, 1993.

k. Di Q, Wang Y, Zanobetti A et al. Air pollution and mortality in the Medicare population. *New England Journal of Medicine* 2017; 376: 2513-2522.

l. MassDEP Office of Research and Standards. Supporting Documentation for MassDEP Air Guidelines, Formaldehyde: December 8, 2014.

m. MassDEP Office of Research and Standards. Supporting Documentation for MassDEP Air Guidelines, Formaldehyde: November 30, 2011.

n. Prefiled Testimony of Justin Fickas.

IV. Summary of Expert Opinions

21. In my professional medical opinion, the siting of a natural gas compressor station in a densely populated, low-lying, environmentally degraded area of North Weymouth, Massachusetts,

immediately adjacent to the sea, is extremely ill-advised for multiple reasons.

22. I therefore believe that the Compressor Station, if constructed and operated under the Plan Approval, would introduce a serious risk of polluting the surrounding ambient air and contributing to already highly-elevated levels of pollutants, including air toxics such as formaldehyde and benzene.

23. I further believe that the scope and magnitude of these relevant risks have been improperly minimized or entirely omitted from the Plan Approval and the Health Impact Assessment upon which it is partially based.

24. In my opinion, the Compressor Station represents a threat to the public health of such substantial magnitude that MassDEP should not have issued the Plan Approval.

V. High Background Rates of Disease and Pre-Existing Air Pollution.

25. While I disagree with many of the conclusions and facts of the Health Impact Assessment, that assessment compiled certain data that I view as helpful in analyzing the Compressor Station and Plan Approval.

26. Weymouth and other communities surrounding the site of the proposed Compressor Station already have elevated rates of heart disease, stroke, chronic lung disease and cancer compared to other communities across Massachusetts. The Health Impact Assessment identified statistically significant elevations in rates of

cardiovascular and respiratory diseases, as well as multiple types of cancer, in those surrounding communities.[2]

27. In the Health Impact Assessment, MassDEP and other agencies irresponsibly attempt to blame these elevated rates of disease and premature death on smoking, diet and other "lifestyle" factors. In my professional medical opinion, those conclusions are erroneous because they are not supported by any data on "lifestyle" risk factors in the local populations cited in the Health Impact Assessment, and moreover because they fly in the face of an established body of science that unequivocally links air pollution to elevated risks of multiple chronic diseases and premature death.

28. To the extent such assumptions or attempts factored into MassDEP's decision-making they must be disregarded.

29. Air pollution is a well-established cause of heart disease, stroke, chronic lung disease and cancer. It is responsible for an estimated 6.5 million deaths from these and other diseases globally each year, including an estimated 107,000 deaths in 2017 in the United States.

30. Until proven otherwise, it must be concluded that air pollution and other forms of environmental contamination from past and current industrial operations as well as from vehicular traffic on the Fore River Bridge are important contributors to the observed elevated rates of cancer and other chronic diseases in the

2 Source: PSR Report, p. 8 (https://gbpsr.org/wp-content/uploads/sites/11/2019/02/gbpsr-report-weymouth-compressor-station.pdf) and HIA Appendix B.

communities surrounding the site of the proposed compressor station.

31. To put it another way, it is not reasonable to presume or conclude that air pollution is not a cause of disease in this community when it is well established that air pollution causes disease and premature deaths in other communities across the United States and around the world.

32. Emissions of additional toxic and carcinogenic airborne pollutants into these communities from the proposed Compressor Station will add to the heavy burden of environmental contamination already present in the area. It will worsen air pollution and result in further additive increases in risk of disease, disability and premature death in the surrounding communities.

33. I note, also from the Health Impact Assessment, that there are 2,218 children under the age of 10 years in the communities closest to the site of the proposed Compressor Station (the focus area), 15,194 children under age 10 in the remainder of Weymouth and Quincy, and 7,675 children in this age group in the towns of Braintree and Hingham.

34. I note additionally that the immediately adjoining communities contain six schools with about 1,700 students, elderly housing, nursing homes and a mental health facility.

35. Children in communities and schools are highly vulnerable to toxic and carcinogenic environmental pollutants such as those that will be emitted by the proposed natural gas compressor station.

36. Children's great vulnerability to toxic chemicals in the environment reflects the fact that they have greater exposures per pound of body weight to toxic chemicals than adults. They also have greater biological sensitivity. Children are especially vulnerable to toxic and carcinogenic air pollutants because, compared to adults, they breathe four times as much air each day per pound of body weight and thus have four times more severe exposures.

37. Children also have many years of future life in which to develop cancers and other chronic diseases that may be triggered by toxic exposures in early life. This factor heightens their vulnerability still further.

38. The elderly are a second vulnerable population in the communities surrounding the proposed natural gas compressor station. There are elder-care centers near the compressor. The adjoining census tracts have 3,556 inhabitants over the age of 65.

VI. Specific Dangers of Air Toxics

A. Overview of Benzene and Formaldehyde

39. Benzene and formaldehyde are two hazardous and carcinogenic air pollutants or "air toxics." Both are proven human carcinogens. Both are of medical concern to me in regard to emissions from this proposed Compressor Station.

40. Both the Plan Approval and the Health Impact Assessment show that benzene, formaldehyde, and other air toxics will be released to the air during construction and operation of the

Compressor Station, and likely to be released at even higher levels during maintenance and during pipeline blowdowns.

41. Benzene is a volatile chemical that is emitted in significant quantities from human-caused sources of fuel combustion. It is emitted from gasoline service stations, motor vehicle exhaust, and, as I understand from the Plan Approval and Health Impact Assessment, will be emitted from the proposed Compressor Station's turbine.

42. Benzene is a proven cause of leukemia, including childhood leukemia, multiple myeloma and non-Hodgkin lymphoma. Leukemia is a cancer that negatively impacts the body's blood-forming tissues, including bone marrow and the lymphatic system.

43. Formaldehyde is a proven cause of cancer of the nasopharynx and a proven cause of leukemia. The nasopharynx is a portion of the upper airway located behind the nose and above the back of the throat.

B. Risks of Cumulative Exposure to Air Toxics

44. Both benzene and formaldehyde have been shown to cause cancer down to the lowest levels measurable in air.

45. Neither formaldehyde nor benzene naturally occurs in significant levels or concentrations in ambient air. There are, however, many human-caused sources of benzene and formaldehyde in ambient air.

46. From the materials I have reviewed, I understand that the Compressor Station will be such a human-caused source of benzene and formaldehyde.

47. There are, in my opinion, no “safe” levels of either air toxic in the air. Indeed, the Massachusetts Department of Environmental Protection’s 2011 publication, Methodology for Updating Air Guidelines: Allowable Ambient Limits (AALs) And Threshold Effects Exposure Limits (TELs) notes that carcinogenic pollutants such as benzene and formaldehyde are “non-threshold” pollutants, meaning that no level of exposure to these chemicals is without hazard.

48. Higher levels of cumulative exposure to these toxic chemicals are clearly associated with greater risks of cancer, and no level of benzene or formaldehyde in air is without some risk of cancer.

49. It is important to recognize additionally that the risks to health resulting from exposure to benzene, formaldehyde or other toxic air pollutants reflect the cumulative sum of exposures to these materials from all sources. Thus combined exposures to multiple toxic and carcinogenic chemicals—such as combined exposures to benzene and formaldehyde—produce additive or even synergistic effects on human health resulting in additive or synergistic increases in risk of cancer and other diseases.

50. This consideration is especially relevant in relation to the proposed siting of this natural gas compressor station in the Fore River Basin. The Fore River basis is an area of dense urban and industrial development. Background levels of toxic pollutants in air are already elevated as the consequence of past and current releases from industrial and vehicular sources. Among other

sources, the proposed site for this Compressor Station is close to the Fore River Bridge (Route 3A) and other industrial facilities.

51. The Compressor Station's introduction of additional emissions of benzene, formaldehyde, and other air toxics will therefore increase the cumulative exposure and further magnify the cumulative risks of cancer and other diseases among the people who live, work, and otherwise visit the Fore River Basin and surrounding communities. The Health Impact Assessment includes no consideration of the contributions of background exposure to total exposure and includes no consideration of possible additive or synergistic risks of combined exposures to benzene and formaldehyde. Because of these omissions, the Health Impact Assessment seriously underestimates the risk of cancer and other diseases that will be posed to people in communities surrounding the Fore River basin by toxic and carcinogenic emissions from the proposed Compressor Station.

C. Heightened Risks of Air Toxics to Infants, Children and the Elderly

52. Infants and children are especially vulnerable to low-level exposures to chemical carcinogens such as benzene and formaldehyde.

53. As I have noted above in paragraphs 36-38, children and the elderly are two groups within the general population at increased risk of disease and premature death from exposures to toxic chemicals and other environmental hazards.

54. Because I am a pediatrician, I have focused especially in my work on elucidating the hazards of environmental threats to children's health. My work in this area began in 1988 when I was appointed by the US National Academy of Sciences to chair a congressionally mandated Committee on Pesticides in the Diets of Infants and Children. Our Committee's charge was to assess children's exposures and vulnerabilities to pesticides and other toxic chemicals and to determine whether the laws and regulations then in force were doing an adequate job of protecting children against chemical hazards.

55. Our National Academy of Sciences Committee found in our 1993 report that children are much more heavily exposed and more sensitive to pesticides and other toxic chemicals than adults. We summarized our findings in the phrase, "Children are not little adults." The underlying concept is that children are qualitatively and quantitatively different from adults in their patterns of exposure and in their vulnerabilities to environmental hazards. The health consequences of environmental exposures in infancy and childhood are often very different from the consequences of exposures later in life. Exposures to toxic chemicals and pollutants in early life are now understood to increase risk of disease, disability and premature death across the life span.

56. The analysis by our National Academy of Sciences Committee identified four key differences between children and adults that contribute to children's heightened susceptibility:

- Children breathe more air, drink more water, and eat more food than adults each day on a per-kilogram body-weight basis and therefore have proportionately greater exposures to pesticides and other toxic chemicals.
- Children are at especially high risk to airborne toxins because, on a body-weight basis, they inhale four times as much air each day as an adult and therefore have four-fold higher exposures per pound of body weight.
- Children's metabolic pathways are immature and therefore children are unable to rapidly detoxify and excrete many toxic chemicals.
- Children's exquisitely delicate developmental processes are easily disrupted. There exist windows of vulnerability in early human development that have no counterpart in adult life. Exposure to even very low doses of toxic chemicals or other environmental hazards during these sensitive periods can increase risk of disease in childhood and across the life span.
- Children have more future years than adults to develop diseases of long latency that may be triggered by harmful exposures in early life.

57. Our Committee's findings apply to the increased exposures of children who live in North Weymouth, go to school there, or otherwise visit the area. They are at a heightened health risk from exposure to benzene, formaldehyde, and other air toxics that will be emitted by the Compressor Station for all of the reasons I cite in paragraph 56.

VII. Analysis of State AAL and TEL Guidelines for Air Toxics Emissions

58. I am aware that legal guidelines have been established by state and federal agencies to limit levels of benzene, formaldehyde and other toxic pollutants in community air.

59. These guidelines have proven effective over the past half century in reducing levels of air pollution by these and other air toxics from much higher levels of those toxics that previously existed in ambient air. MassDEP and other regulators deserve credit for their efforts in this regard.

60. However, these guidelines also have inherent limitations that need to be recognized.

61. First, it is important to know how environmental air guidelines are derived. They are generally based on data produced in epidemiological studies of occupationally exposed workers and/or studies of animals exposed in experimental laboratories.

62. Exposure-response relationships are established in those studies in which a given level of exposure is correlated with a certain risk of disease. Because occupational and experimental studies generally involve exposure levels substantially higher than those encountered in community settings, data from occupational and experimental studies are extrapolated downward to estimate risk from a given level of exposure in the community.

63. To put it a different way, the guidelines are based on scientific and medical studies that are used to create a model for health risks based on exposure levels.

64. It is important to note that multiple assumptions are made in the extrapolations that underlie these risk assessment models and the resulting setting of guidelines. The environmental standards and guidelines that are used to protect the health of people in communities are developed using a well-accepted and very sophisticated methodology, but they are not based on direct studies of people in community settings. Instead, these standards and guidelines rest on a series of mathematical models and regulatory assumptions.

65. Any alterations in those models and assumptions can substantially affect the level of exposure that is chosen to be the guideline.

66. An example is seen in the procedures used by MassDEP to set the TEL for benzene and formaldehyde in community air. In setting these guidelines, MassDEP assumed that only 20% of a person's exposure to benzene and formaldehyde comes from ambient air and that the remaining 80% comes from other potential sources of exposure, such as water, soil, food and indoor air. This assumption is termed a relative source contribution (RSC) factor. It is based on MassDEP's estimation of the <u>average</u> contribution of ambient air to total benzene and formaldehyde exposure in communities across the state. While this assumption may be valid in many communities, it is not a reasonable assumption in communities such as those surrounding the Fore River Basin, where background levels of disease and environmental contamination are far above the Massachusetts average as the consequence of

industrial and automotive emissions and will be pushed higher still if the proposed natural gas compressor station comes on line.

67. This brings me to my largest criticism of MassDEP's application of its AALs and TELs and to the Compressor Station. MassDEP, in its Plan Approval, did not take into account the already highly-elevated background levels of formaldehyde, benzene, and other air toxics in the Fore River area.

68. The Health Impact Assessment includes both data and discussion of the current, background levels of benzene, formaldehyde, and other air toxics already present. These data come from MassDEP's monitoring stations in the Boston urban area and from some limited monitoring conducted by MassDEP in connection with that assessment.

69. These data show, on pages 79-82 of the Health Impact Assessment, that average annual concentrations of both benzene and formaldehyde are highly-elevated and are many times above the applicable AAL. These data similarly show 24-hour elevations that are highly-elevated and exceed the applicable TEL.

70. In my professional medical opinion, these existing, elevated, background levels of benzene and formaldehyde already present a serious risk to public health—specifically elevated risks of leukemia, lymphoma and other cancers. These risks will be particularly great for vulnerable populations such as children and the elderly.

71. I have not reviewed any MassDEP guideline, testimony, or literature that, in my opinion, provides a medical or reasonable

basis to exclude consideration of background air pollution by formaldehyde and benzene from analysis of the risks associated with the proposed Compressor Station. Where data on background levels exist, I see no reason that they should not be considered and used to inform decision-making.

72. Here, the data exist. MassDEP could and should have used these data on background levels of pollution in assessing the total exposures and the cumulative risks to human health that emissions from the proposed Compressor Station will superimpose upon the already high background exposures and elevated levels of cancer and other diseases in the Fore River Basin. That is true even for the TEL, which already includes an RSC. While that RSC, as I previously testified, is an assumption that may prove valid for many parts of Massachusetts, it is only an assumption that likely is not an accurate assumption for this locale. When data specific to a particular locality are available, as is the case here, MassDEP could and should have modified its TEL analysis, and its estimate of the RSC to reflect actual, documented conditions in the Fore River area. I do not believe there is a justifiable or defensible reason to make assumptions where specific data are available.

73. Taking the already chronically elevated background levels of benzene and formaldehyde into account, it is my professional medical opinion that the Health Impact Assessment has seriously underestimated the totality of the health hazards that will be associated with emissions from the proposed Compressor Station, and that the already serious risk to public health presented by these

background levels will increase still further with the addition of the benzene and formaldehyde that will be emitted by the Compressor Station.

74. Yet another limitation in environmental guidelines is that they are not based solely on protection of human health. All guidelines are compromises, inasmuch as they take into consideration economic and other factors in addition to health protection in setting legal limits. The consequence is that no legal guidelines for a chemical carcinogen in air is fully protective of human health. MassDEP implicitly acknowledges this limitation when it describes benzene and formaldehyde as no-threshold toxins (*i.e.*, toxic chemicals for which there is no safe level of exposure).

75. Still another flaw in the HIA's evaluation of the hazards associated with toxic emissions from the proposed natural gas Compressor Station is its pretense that these emissions will be released into a vacuum. Based on this flawed assumption, the HIA evaluated the health hazards of Compressor Station emissions as if they will be released into a pristine, unpolluted environment with zero background risk. But in the real world of the Fore River Basin, emissions from the proposed Compressor Station will be added to the many other forms of pollution already present in North Weymouth and South Quincy. The result is that people living in those and surrounding communities will have an aggregate risk that reflects their total exposure to all pollutants in the area and not merely to emissions from the proposed Compressor Station.

VIII. Review of Clean Harbors Health Impact Assessment.

76. The much more comprehensive procedure used by MassDEP and developed by MassDPH in 1990 to assess the risks to human health that would have been associated with the siting of a proposed Clean Harbors rotary kiln waste incinerator in the Fore River Basin, just a short distance away from the location of the proposed Compressor Station, stands in sharp contrast with the much more truncated, less realistic, and less health-protective procedures that the HIA has used to assess risk in the current instance. In their 1990 assessment, MassDPH noted the following points of fact in relation to pollution and health in the Fore River basin:

> (1) Health data show that the nearest communities, e.g.,Quincy and Weymouth, have greater rates of respiratory disease than those for the state.
> (2) There are a number of "sensitive" groups of people living in close proximity to the site—elderly people, for example, represent a greater proportion of the population close to the site than in the Commonwealth.
> (3) The area within one mile of the site has a number of health care facilities for the mentally ill and elderly, housing for the elderly, and schools.

These findings led to the following conclusions in his 1990 decision:

> (1) The people living close to the site have an excess of respiratory health problems which may predispose them to other health problems if they were exposed to normal emissions from the facility or excessive emissions in the event of an accident.
>
> (2) The elderly people (which make up a higher-than-average proportion of those living close to the site) may

be predisposed to health problems if they were exposed to normal emissions from the facility or excessive emissions in the event of an accident.

(3) It is doubtful that in the event of an emergency, residents living close to the site, particularly disabled and elderly people, could be safely and promptly evacuated.

On the basis of these conclusions, the siting of a waste incineration facility at the proposed Fore River site was denied in 1990 by MassDEP and MassDPH. MassDEP has not presented any rationale – scientific or other - explaining the basis for the sharp change in their hazard assessment procedures that they have made between 1990 and the present.

IX. Review of MassDEP Prefiled Testimony.

77. In connection with my testimony, I have reviewed the prefiled testimony of Dr. Sandra Baird submitted for MassDEP.

78. I believe that Dr. Baird has accurately recited the methodology used to develop MassDEP's AALs and TELs. I have no disagreement with her in this regard.

79. I disagree, however, with Dr. Baird's conclusions that those AALs and TELs are conservative or that they sufficiently protect the public health with respect to the Compressor Station's emissions of benzene, formaldehyde, and other air toxics. I disagree for the reasons I have already listed in my testimony.

80. I note further that background levels of both benzene and formaldehyde in the Fore River Basin routinely exceed their respective AALs and TELs. This background pollution compounds the inherent limitations in the standard-setting process and

contributes to the elevated environmental exposures and the heightened risk of cancer and other diseases noted in the communities surrounding the Fore River Basin.

X. Review of Algonquin Prefiled Testimony

81. In connection with my testimony, I have reviewed the prefiled testimony of Justin Fickas submitted for Algonquin Gas Transmission.

82. Mr. Fickas states (in paragraph 36) that “maximum expected emissions of air toxics from combustion sources and sources of fugitives evaluated at the proposed facility will not cause or contribute to a violation of the applicable 24-hr average TELs and annual average AALs.”

83. Given that background levels of benzene and formaldehyde in the air of communities surrounding the Fore River Basin already substantially exceed MassDEP TELs and AALs, and given that any emissions from the proposed Compressor Station will inevitably add further to these already violative conditions, this claim is indefensible and false. The Fore River Basin is not a rural environment. It is a heavily polluted, densely industrialized peri-urban environment. Toxic emissions from the proposed Compressor Station will add to the already noxious environmental conditions present there and will further elevate the already heightened risks of cancer and other chronic diseases in the surrounding communities.

XI. Application of Conclusions to State Regulatory Standard

84. In connection with my testimony, I was asked to review the definition of "Air Pollution" under the State's regulatory standard at 310 C.M.R. 7.01.

> AIR POLLUTION means the presence in the ambient air space of one or more air contaminants or combinations thereof in such concentrations and of such duration as to:(a) cause a nuisance; (b) be injurious, or be on the basis of current information, potentially injurious to human or animal life, to vegetation, or to property; or (c) unreasonably interfere with the comfortable enjoyment of life and property or the conduct of business.

I was further asked to review the State's regulation at 310 C.M.R. 7.01(1):

> No person owning, leasing, or controlling the operation of any air contamination source shall willfully, negligently, or through failure to provide necessary equipment or to take necessary precautions, permit any emission from said air contamination source or sources of such quantities of air contaminants which will cause, by themselves or in conjunction with other air contaminants, a condition of air pollution.

85. In my medical opinion, the existing levels of formaldehyde, benzene, and other air toxics in Weymouth and the other areas measured in the Health Impact Assessment constitute "air pollution" within the definition set forth in 310 C.M.R. 7.01, because they are injurious to human life. I reach this opinion based upon all the reasons I have described in my testimony.

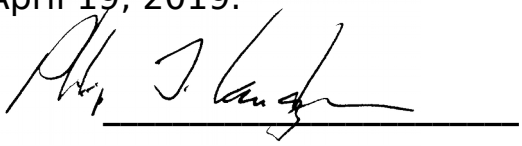
86. In addition, in my medical opinion, emissions from the Compressor Station, in conjunction with already-existing background levels of air pollution, would cause a "nuisance," would be "injurious to human…life," would "unreasonably interfere" with life and

property, and therefore would constitute “air pollution.” I also reach this opinion based upon all the reasons I have described in my testimony.

XII. Conclusion

87. This concludes my direct prefiled testimony. To the best of my knowledge, belief, and based upon the materials I listed earlier that I have reviewed in connection with this testimony, this testimony is accurate as of the date set forth below.

I make the statements above and submit this testimony under the pains and penalties of perjury on April 19, 2019.



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